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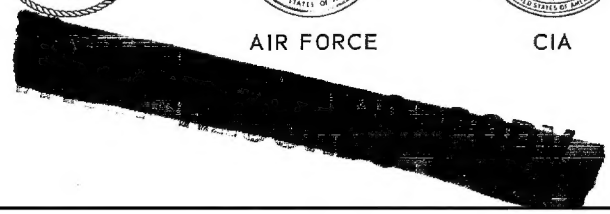
PHOTOGRAPHIC INTERPRETATION REPORT

PROTON SYNCHROTRON UNDER CONSTRUCTION SERPUKHOV, USSR

ARMY AIR FORCE CIA



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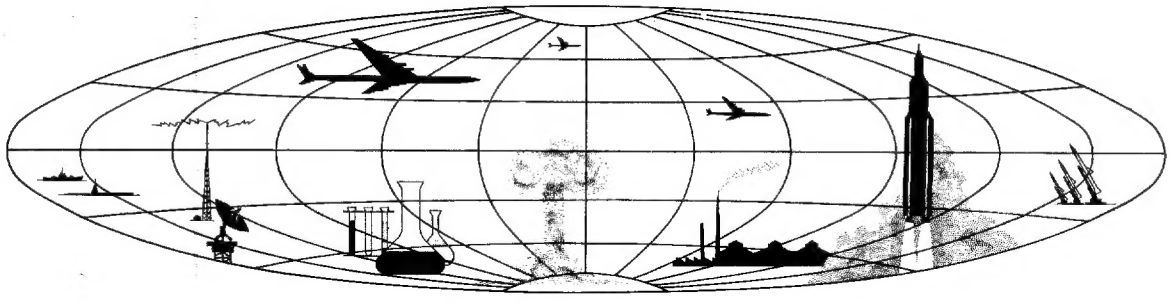

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PROTON SYNCHROTRON UNDER CONSTRUCTION

SERPUKHOV, USSR

SUMMARY

The planned 50 to 70 billion-electron-volt (BEV) proton synchrotron to be located near Serpukhov, USSR, has been identified on [redacted] 25X1 The synchrotron is still in early stages of construction, having been started just prior to [redacted] 25X1 Plans have been published and when the synchrotron is completed it will be the world's largest accelerator.

INTRODUCTION

The site for the synchrotron (54-52N 37-11E) is located 8.5 nautical miles (nm) west-southwest of Serpukhov, USSR, and approximately 70 nm south of Moscow (Figure 1).

Several years ago the Soviets announced plans to construct a 50-BEV proton synchrotron. [redacted] 25X1 it was stated that the energy of the synchrotron would be increased to 70-BEV based on a modification of Western design. A technical manual by Prof. A. N. Komarovskiy, a Soviet scientist, published in 1960, reported that the Serpukhov site was selected after considering 40 sites in 14 regions. 1/ A factor in selecting the area is the presence of a limestone bed on which the synchrotron will be erected.

Observable features of the Serpukhov site are compared in this report with features of the largest US proton synchrotron, located at Brookhaven Laboratories on Long Island, and those in the initial plans for the Serpukhov synchrotron found in Komarovskiy's manual. 1/

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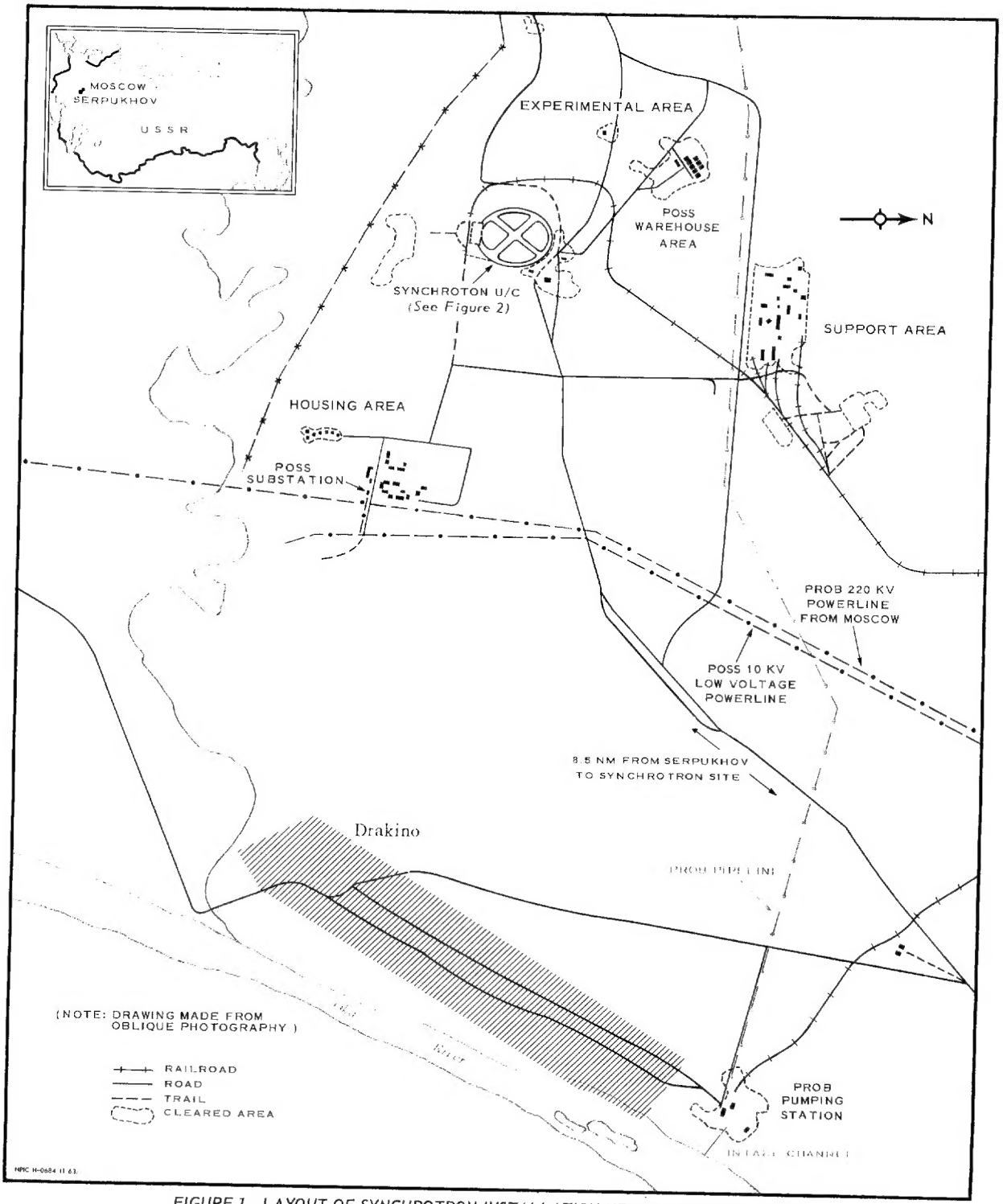

FIGURE 1. LAYOUT OF SYNCHROTRON INSTALLATION NEAR SERPUKHOV, USSR.

PHOTOGRAPHIC OBSERVATIONS

The synchrotron under construction was first identified on [redacted] 25X1 25X1 However, a review of earlier [redacted] 25X1 revealed that construction had just begun. Photography from both missions is of poor quality. The extremely small scale and the obliquity of the photography affect the accuracy of measurements. Thus, all mensural data given in this report are approximate.

The installation encompasses an area of approximately 6.25 square nautical miles located in a densely wooded area on the west bank of the Oka River (Figure 1). Although the area has not yet been secured, a possible fence is observed along the south side of the installation. The installation consists of three areas: an experimental area where the synchrotron is under construction, a support area, and a housing area. A clearing northwest of the synchrotron contains ten possible warehouses. A probable pumping station is located 3.8 nm east of the installation. Both the installation and the probable pumping station are served by a rail line which joins the Moscow/Tula main rail line just north of Serpukhov.

25X1 The photography of [redacted] showed the Support area, four apartment buildings in the Housing Area, and a clearing in the Experimental Area, probably for surveying of the circular magnet tunnel.

Experimental Area

The principal structure of the Experimental Area is the synchrotron (Figure 2). The diameter of the area cleared for the circular tunnel which will house the magnet sections for the synchrotron is approximately 1,600 feet. This is very close to the 1,590-foot diameter of the Serpukhov synchrotron as given in Dr. Komarovskiy's manual (Figure 3). 1/ 25X1

The circular magnet tunnel will be constructed below ground level and some excavating is observed in the eastern portion of the synchrotron (Figure 2). Only a cleared lane was evident in [redacted] in the western portion. 25X1 According to Soviet plans, the tunnel to house the magnets will be [redacted] 25X1 wide and will be constructed [redacted] below 25X1 ground level. Earth covering above ground level will be 35 feet. 1/ Construction of the tunnel itself had not begun in [redacted] 25X1

A possible building foundation or platform, measuring 485 feet in length, is located on the south side of the synchrotron, alongside the rail spur. This may be the foundation for a linear accelerator building or it may be an offloading platform for the handling of heavy magnet sections. The absence of indications of extensive fabrication activity in the Support Area leads to the conclusion that the magnets would probably be shipped in by rail rather than be fabricated at the site. The large clearing on the northeast side of the synchrotron is a possible site for experimental halls and laboratories.

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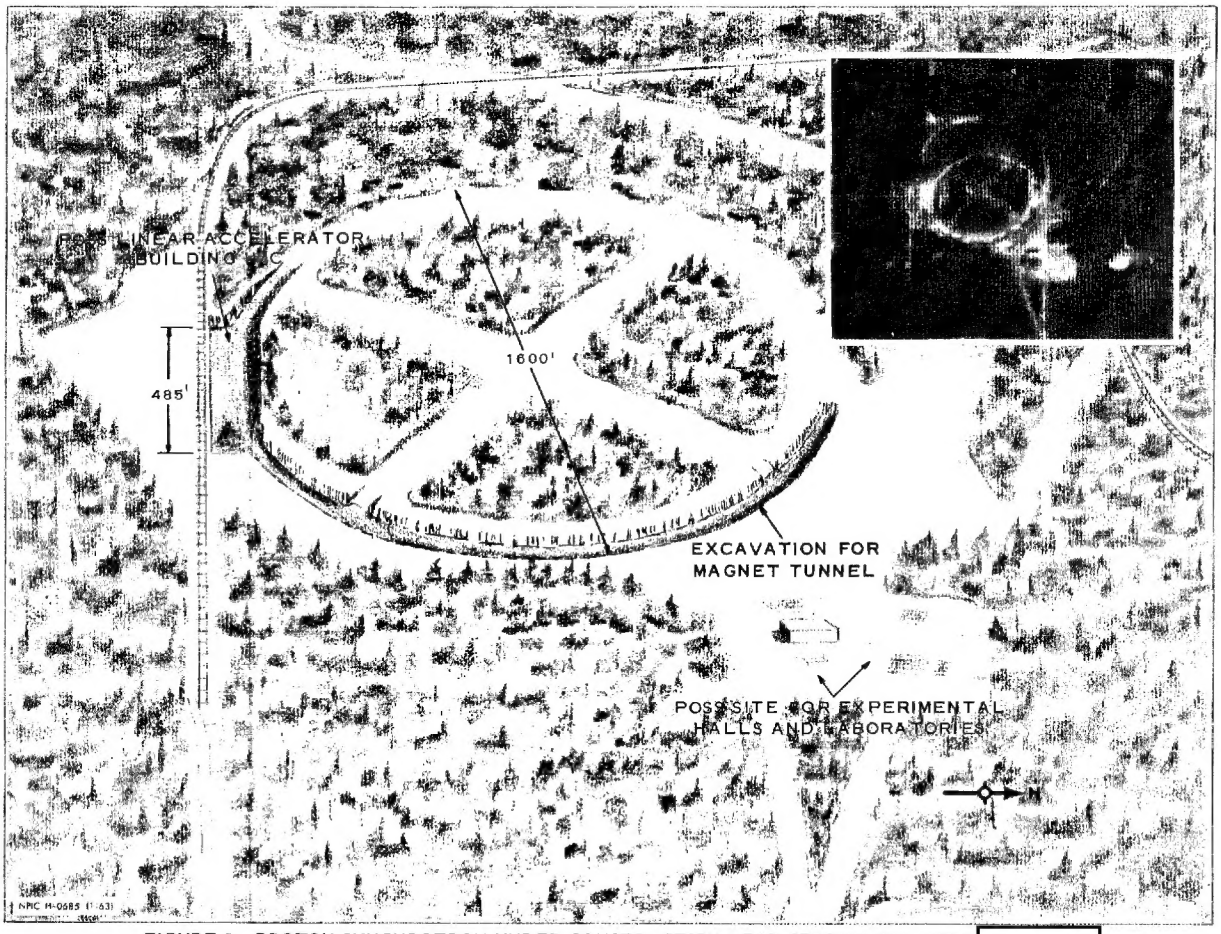

FIGURE 2. PROTON SYNCHROTRON UNDER CONSTRUCTION NEAR SERPUKHOV, USSR [redacted] 25X1

Water

The synchrotron, when it becomes operational, will require extensive water facilities for cooling. A closed-circuit water system will probably be used for cooling the machine, necessitating cooling towers and a filter plant in the Experimental Area. The water will probably be directed to the Experimental Area from the probable pumping station situated on the Oka River (Figure 1).

Three medium-sized buildings and signs of an intake channel from the Oka River are identified within the pumping station area. A probable pipeline from the pumping station passes west through the installation, but its terminus cannot be located. Whether this pipeline will eventually supply water for the synchrotron cannot be determined.

Electric Power

Approximately 60 megawatts of power will be required for the synchrotron and the experimental equipment. It is not possible at the present stage of construction to determine the power source because no power traces to the Experimental Area are observed. Two power lines pass through the installation (Figure 1). One is a probable 220-kilovolt (kv) power line running

south from Moscow to Tula. Another low-voltage, possible 10-kv, power line runs parallel to the probable 220-kv line. However, its terminus cannot be located. A small, possible substation for limited power requirements is located in the housing area.

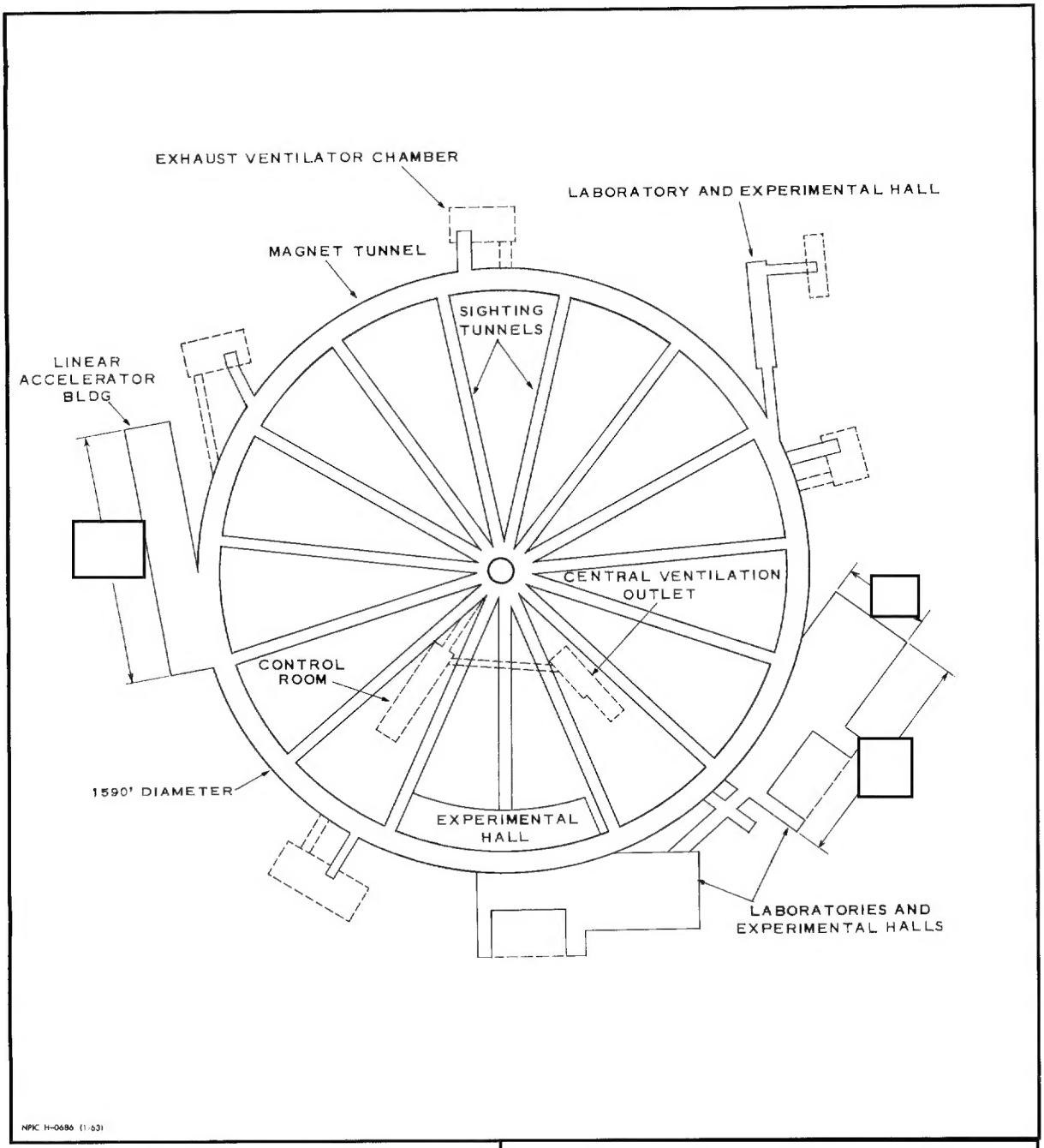

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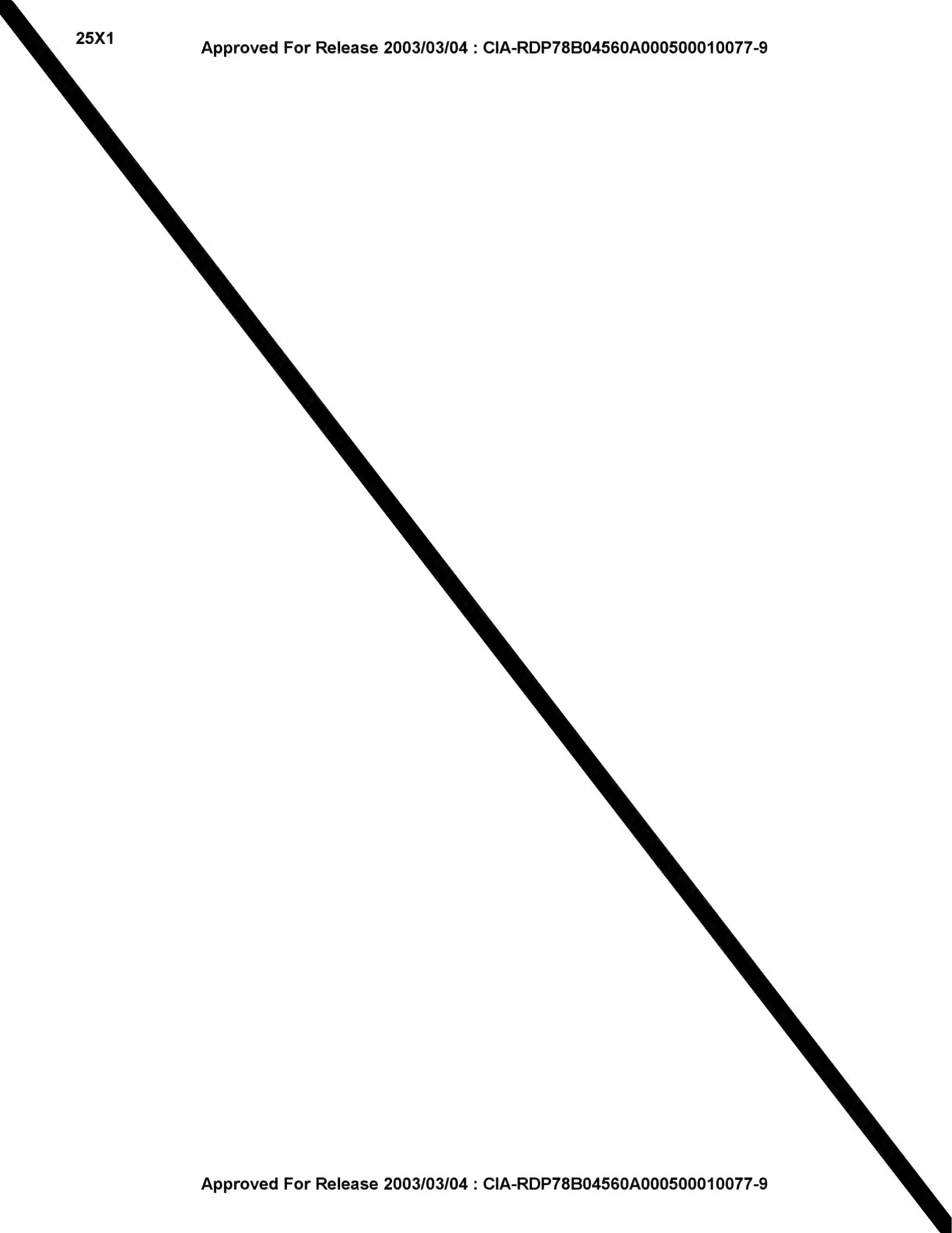
FIGURE 3. PLAN OF SERPUKHOV SYNCHROTRON



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OTHER AREAS

Support Area

The Support Area was observed on poor-quality [redacted] 25X1 only four buildings were discernible. The latest photography [redacted] 25X1 revealed approximately 17 storage-type buildings of various sizes. Four rail spurs enter the east side of the area. The area provides general storage and probably serves as a receiving point. The Support Area is rectangular and measures 3,000 feet by 1,600 feet. Two smaller unidentified scarred-out areas are observed east of the Support Area (Figure 1).

Housing Area

The housing connected with the installation consists primarily of 15 apartment houses and seven single-family or duplex dwellings. One possible administrative-type building was obser-ed. A possible power substation is found in the eastern section of the Housing Area.

25X1

REFERENCES

[redacted]

MAPS OR CHARTS

ACIC. US Air Target Chart, Series 200, Sheet 0167-10A, 1st ed, Jan 59, scale 1:200,000 (SECRET)

DOCUMENTS

1. US Joint Publications Research Service, JPRS 7385, 21 Dec 60. Translation of Prof. A. N. Komarovskiy, Structural Designs of Accelerators, Moscow, 1958, pp 45, 112, 113, 170, 171 (UNCLASSIFIED)

Komarovskiy, A. N., Stroitel'nyo Konstruktsii Uskoriteley (Structural Designs of Accelerators), Moscow, rev ed., 1961 (UNCLASSIFIED)

RELATED DOCUMENT

[redacted] 25X1

REQUIREMENT

CIA. OSI/R-124/62-KH

NPIC PROJECT

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